

7.2 Precipitating salts

A precipitate is a solid formed from solution during a chemical reaction. An insoluble salt can be precipitated by mixing two other salt solutions. One of these contains the cation of the insoluble salt and the other solution the anion.

Aim

To investigate the formation of precipitates on mixing solutions of salts.

Apparatus and materials

Five test-tubes
Test-tube rack
Glass stirring rod
Distilled water
Solutions of:

copper(II) sulphate, 1 mol dm^{-3}
lead(II) nitrate, 1 mol dm^{-3}
potassium iodide, 1 mol dm^{-3}
silver nitrate, 0.1 mol dm^{-3}
sodium carbonate, 1 mol dm^{-3}

Procedure

- 1 Wash out five test-tubes with tap water and then distilled water. Place them in the test-tube rack.
- 2 One third fill the test-tubes with copper(II) sulphate solution.
- 3 Add lead(II) nitrate solution to the copper(II) sulphate solution until the test-tube is two-thirds full.
- 4 Mix the two solutions by stirring with a glass rod. Remove the glass rod. Wash it with tap water and then distilled water.
- 5 Record your observation in the results table.
- 6 Repeat steps 1–5 with potassium iodide,

silver nitrate, sodium carbonate and potassium iodide solutions.

- 7 Repeat steps 1–6 for the other possible combinations of solutions shown in the results table below.

Results

Copy and complete the table at the bottom of the page.

In each space note what happens, for example, 'white precipitate'. If no reaction occurs put a dash '-'.

Extra work

- Carry out a similar experiment using solutions of the following six salts:
lead(II) nitrate
magnesium sulphate
barium chloride
silver nitrate
sodium carbonate
calcium chloride.

Questions

- 1 a) The silver nitrate solution used in this experiment is very dilute. Suggest a reason for this.
b) Why must tap water not be used to make solutions of the salts?
c) Which precipitates are coloured?
d) Why is the use of five test-tubes in the experiment so convenient?
e) What colour is produced when a blue precipitate is formed in a yellow solution?
- 2 Name the precipitates formed in the experiment.
- 3 Write equations for the reactions that produce precipitates.

	copper(II) sulphate(aq)	lead(II) nitrate(aq)	potassium iodide(aq)	silver nitrate(aq)	sodium carbonate(aq)
copper(II) sulphate(aq)					
lead(II) nitrate(aq)					
potassium iodide(aq)					
silver nitrate(aq)					
sodium carbonate(aq)					